Message

From: Orme-Zavaleta, Jennifer [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=3C5A111DC377411595E5B24B5D96146B-ORME-ZAVALETA, JENNIFER]
Sent: 4/14/2021 12:20:24 PM
To: Blackburn, Elizabeth [Blackburn.Elizabeth@epa.gov]; Rodan, Bruce [rodan.bruce@epa.gov]; D'Amico, Louis [DAmico.Louis@epa.gov]
CC: Frey, Christopher [Frey.Christopher@epa.gov]; Hubbard, Carolyn [Hubbard.Carolyn@epa.gov]; Robbins, Chris [Robbins.Chris@epa.gov]
Subject: FW: Toxicogenomics in aquatic vertebrates
Attachments: Page Lariviere et al. 2019.pdf; NTP Report Genomic dose-response Bookshelf_NBK531562.pdf; Thomas et al 2007 Genomic BMDs kfm092.pdf; Farmahin2017_Article_RecommendedApproachesInTheAppl.pdf

So you all are aware – good stuff!

Jennifer Orme-Zavaleta, PhD (she/her/hers)
Acting Assistant Administrator, and
Principal Deputy Assistant Administrator
Office of Research and Development
US Environmental Protection Agency

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Ex. 6 Personal Privacy (PP)

From: Villeneuve, Dan <Villeneuve.Dan@epa.gov>
Sent: Wednesday, April 14, 2021 8:17 AM
To: Goldstein, Bernard D <bdgold@pitt.edu>
Cc: Orme-Zavaleta, Jennifer <Orme-Zavaleta.Jennifer@epa.gov>; Frey, Christopher <Frey.Christopher@epa.gov>; LaLone, Carlie <lalone.carlie@epa.gov>; Biales, Adam <Biales.Adam@epa.gov>; Flynn, Kevin <Flynn.Kevin@epa.gov>; Hoff, Dale <Hoff.Dale@epa.gov>; Hornung, Michael <Hornung.Michael@epa.gov>
Subject: RE: Toxicogenomics in aquatic vertebrates

Hello Dr. Goldstein,

Research and development on the use of transcriptomics-based points of departure as a lower bound toxicity estimate for ecotoxicology is in relatively early stages relative to the work that has been done in mammalian systems. Our ORD research effort in this area is only about a year old and Environment and Climate Change Canada started to explore this approach in ecotoxicology just a year or two earlier, but the Covid-19 pandemic has delayed both efforts to some extent. To my knowledge, there have been no specific applications to marine species or to the characterization of crude oil toxicity, to date. At least not with regard to transcriptomic-concentration response modeling, although I'm sure you would find a number of toxicogenomic studies examining effects of oil on various aquatic organisms.

I have attached a couple of key publications on the general approach from the mammalian/human health literature. There has been one publication from an ecotoxicology perspective that did an evaluation of the concept using datasets that were available in the literature. Environment and Climate Change Canada is also working on a review article covering both human health and ecological research in this area, although the paper is still under development. We did some early work on the concept when it was referred to as NOTEL (no observed transcriptional effect level) about 10 years ago, but at the time the transcriptomics technologies weren't cost effective enough to make the approach practical. However, both the reduced costs and improved computational approaches for handling the data over the last decade now make the approach much more tractable. A proof of concept with a large library of chemicals tested in multiple species is underway. Conceptually, there is no reason to think the approach could not be used to characterize the toxicity of complex mixtures like crude oil, provided you can get the substance of interest into solution for testing through preparation of water accommodated fractions (WAFs) or similar approaches.

The attached papers should give a good sense of the overall approach. If your Effects subcommittee is interested in more details about our current research efforts in this area, we'd be happy to present more details about our approach and preliminary results.

Thanks for your interest,
Dan V.

From: Goldstein, Bernard D <bdgold@pitt.edu>
Sent: Tuesday, April 13, 2021 6:32 PM
To: Villeneuve, Dan <Villeneuve.Dan@epa.gov>
Cc: Orme-Zavaleta, Jennifer <Orme-Zavaleta.Jennifer@epa.gov>; Frey, Christopher <Frey.Christopher@epa.gov>; LaLone, Carlie <lalone.carlie@epa.gov>; Biales, Adam <Biales.Adam@epa.gov>; Flynn, Kevin <Flynn.Kevin@epa.gov>
Subject: Re: Toxicogenomics in aquatic vertebrates

Hi Dan

Thanks for following up

Am impressed with your work and that of your EPA colleagues.

Best way for me to handle this is to hand over info to the rest of the Effects subcommittee, all of whom are experts in marine species except me.

Most helpful would be for me to be able to forward to them three or four papers that make the point that toxicogenomics is an exciting approach that could be predictive of toxicity due to crude oil, its components or its derivatives (e.g., weathered or photodegraded). If it has already been done done in relation to crude oil, or is underway and could be presented at a Committee workshop, that would be particularly of interest - but not necessary

Many thanks in advance. If you have any questions call me at 412 417 9611

Bernie

Sent from my iPhone

On Apr 12, 2021, at 1:26 PM, Villeneuve, Dan <Villeneuve.Dan@epa.gov> wrote:

Hello Dr. Goldstein,

We are indeed working on the use of transcriptomics-based points of departure from aquatic species including fish, crustaceans, aquatic insects, and algae as lower bound estimates of aquatic toxicity and potential data sources for mode of action inference. I would be happy to provide an overview and briefing for you to help you determine the potential relevance to the Oil in the Sea Committee.

Dan V.

From: Orme-Zavaleta, Jennifer <Orme-Zavaleta.Jennifer@epa.gov>
Sent: Monday, April 12, 2021 11:29 AM
To: 'Goldstein, Bernard D' <bdgold@pitt.edu>
Cc: Frey, Christopher <Frey.Christopher@epa.gov>; Villeneuve, Dan <Villeneuve.Dan@epa.gov>; LaLone, Carlie <lalone.carlie@epa.gov>; Biales, Adam <Biales.Adam@epa.gov>; Flynn, Kevin <Flynn.Kevin@epa.gov>
Subject: RE: Toxicogenomics in aquatic vertebrates

Hi Bernie!
Our researchers (copied here) are: Dan Villeneuve, Carlie LaLone, Adam Biales, and Kevin Flynn from our Duluth and Cincinnati facilities. Feel free to reach out and let me know if I can help further

jennifer

Jennifer Orme-Zavaleta, PhD (she/her/hers)
Acting Assistant Administrator, and
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Cel Ex. 6 Personal Privacy (PP)

From: Goldstein, Bernard D <bdgold@pitt.edu>
Sent: Monday, April 12, 2021 10:00 AM
To: Orme-Zavaleta, Jennifer <Orme-Zavaleta.Jennifer@epa.gov>
Cc: Frey, Christopher <Frey.Christopher@epa.gov>
Subject: Toxicogenomics in aquatic vertebrates

Hi Jen

Am on a NASEM committee, Oil in the Sea 4, Inputs, Fate and Effecs. My question is about who at EPA may be doing research on genomic changes in relation to adverse effects on fish or other aquatic species. We've had a presentation on genomic effects, but the focus has been on the impact of bacterial metabolism on the fate of oil constituents rather than on effects in aquatic vertebrates.

I'm of course familiar with EPA's work in which the goal is to develop the use of toxicogenomics as a tool to predict adverse effects in human. Is similar work underway in terms of aquatic species that might be pertinent to the Oil in the Sea committee? If so, whom should I contact?

I'm a late addition to the Committee, added to cover human health issues, so I may have missed it. But I do not recall any ORD staff presentations in the workshops so far

Best regards

Bernie

Bernard D. Goldstein, MD
Graduate School of Public Health
University of Pittsburgh